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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/966,410	09/28/2001	Miroslav Trajkovic	US010476 (702498)	4349

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PHILIPS INTELLECTUAL PROPERTY & STANDARDS  
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EXAMINER

BHATNAGAR, ANAND P

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 09/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/966,410	<b>Applicant(s)</b> TRAJKOVIC ET AL.	
	<b>Examiner</b> Anand Bhatnagar	<b>Art Unit</b> 2623	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 10-16 is/are allowed.
- 6) ☒ Claim(s) 1-3 and 17-19 is/are rejected.
- 7) ☒ Claim(s) 4-9 and 20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. ____   |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>09/28/01&amp;02/24/03</u>   | 6) <input type="checkbox"/> Other: ____                                     |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 17, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Liu et al. ("Robust Head Motion Computation by Taking Advantage of Physical Properties," Proc. Workshop On Human Motion, December 2000, pages 73-77).

Regarding claims 1 and 17: A linear method for performing head motion from facial feature data (Liu et al.; abstract), the method comprising estimation the steps of:

obtaining first facial image and detecting a head in said first image (Liu et al; section 2 on page 73, wherein the points on a head in an image are determined);

detecting position of four points  $P$  of said first facial image where  $P = \{p_{\text{sub } 1}, p_{\text{sub } 2}, p_{\text{sub } 3}, p_{\text{sub } 4}\}$ , and  $p_{\text{sub } k} = (x_{\text{sub } k}, y_{\text{sub } k})$  (Liu et al.; section 2 on page 73 and section 2 continued on page 74, wherein five points (E1, E2, M1, M2, and N) on the face are determined and used. These points are equivalent to applicant's points of p1-p4 because they are the cornerers of the

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eyes and the corners of the mouth. The coordinates of each of these points are determined, second full paragraph of left column on page 74 of Liu et al., which are read as applicant's coordinates of  $p_{sub k}$ ;

obtaining a second facial image and detecting a head in said second image (Liu et al.; section 2 page 74 third full paragraph, wherein two images are used);

detecting position of four points  $P'$  of said second facial image where  $P' = \{p'_{sub 1}, p'_{sub 2}, p'_{sub 3}, p'_{sub 4}\}$ ; and  $p'_{sub k} = (x'_{sub k}, y'_{sub k})$  (Liu et al.; section 2 page 74 third and fourth full paragraphs and equations 1 and 2, wherein two images are used and the corresponding points are determined in each image);

determining the motion of the head represented by matrix  $R$  and translation vector  $T$  using said points  $P$  and  $P'$  (Liu et al.; section 2 page 74 third and fourth full paragraphs and equations 1 and 2, wherein two images are used and the corresponding points are determined in each image. The  $m_{sub l}$  in equation 1 is equivalent to  $P$  and  $m'_{sub l}$  is read as  $P'$ . The  $R$  is the rotation and  $t$  is the translation in the equations).

Regarding claims 2 and 18: The linear method wherein said four points  $P$  of said first facial image and four points  $P'$  of said second facial image include locations of outer corners of each eye and mouth of each respective first and second facial image (Liu et al.; page 73 section two bottom paragraph).

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. ("Robust Head Motion Computation by Taking Advantage of Physical Properties," Proc. Workshop On Human Motion, December 2000, pages 73-77) and Chen et al. ("Head pose estimation using both color and feature information," Pattern Recognition, 2000. Proceedings. 15<sup>th</sup> International conference On September 3-7, 2000, Los Alamitos, CA, USA, IEEE Comput. SOC. US, September 3, 2000, pages 842-845).

Regarding claims 3 and 19: The linear method wherein said head motion estimation is governed according to:

$$P' = R (P \text{ sub } i) + T$$

$$\text{where } R = \begin{bmatrix} r_1^T \\ r_2^T \\ r_3^T \end{bmatrix} = \begin{bmatrix} r_{11} & r_{12} & r_{13} \\ r_{21} & r_{22} & r_{23} \\ r_{31} & r_{32} & r_{33} \end{bmatrix}_{3 \times 3} \text{ and } T = [T \text{ sub } 1 \quad T \text{ sub } 2 \quad T \text{ sub } 3]^T$$

represent camera rotation and translation respectively, said head pose estimation being a specific instance of head motion estimation.

Liu et al. discloses to perform the estimation of motion of a head/face between two images by incorporating the rotation and translational parameters.

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Liu et al. does not teach to incorporate the rotational and translational parameters as defined above in claim 3. Chen et al. discloses to use the rotation and translational parameters as defined above in claim 3 (Chen et al.; all of section 4 pages 843-844, especially equations 5-7. The  $F_{sub i}$  and  $F'_{sub i}$  are read as applicants  $P_{sub i}$  and  $P'_{sub i}$ ). It would have been obvious to one skilled in the art to combine the teaching of Chen et al. to that of Liu et al. because they are analogous in determining head motion between two images. One in the art would have been motivated to incorporate the teaching of Chen et al. into the system of Liu et al. in order to have a system that gives much more reliable recognition results (Chen et al.; first paragraph right column on page 842).

### ***Conclusion***

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Yang et al. (U.S. patent 6,580,810) for using 3 points for facial/head motion estimation and for incorporating rotational and translational parameters (col. 7 lines 35-67).

Liu et al. (U.S. patent pub. 2002/0102010 A1) for estimating head motioning five points.

**Contact Information**

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anand Bhatnagar whose telephone number is (703) 306-5914, whose supervisor is Amelia Au whose number is 703-308-6604, group fax is 703-872-9306, and Tech center 2600 customer service office number is 703-306-0377.



**SAMIR AHMED  
PRIMARY EXAMINER**

AB

Anand Bhatnagar

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September 26, 2004